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ARCHITECTURAL CONCRETE

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Upper stories of the clubhouse are carried on tall circular columns. Ribbed slabs are used for both floors and roof and, as in the grandstand, are left exposed.

(Front cover) From the approach side the architectural concrete grandstand of the Monmouth Park Jockey Club, Oceanport, N.J., appears as a large building of symmetrical design in which the restaurant in the semicircular bay on the first floor is flanked by the main entrances. Corrugated concrete spandrels and the projecting frame around window groups lend interest to the pleasingly simple design. Charles Du Bose, architect, New York, N.Y.; F. H. McGraw & Co., engineers and contractors, Hartford, Conn.

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Architectural
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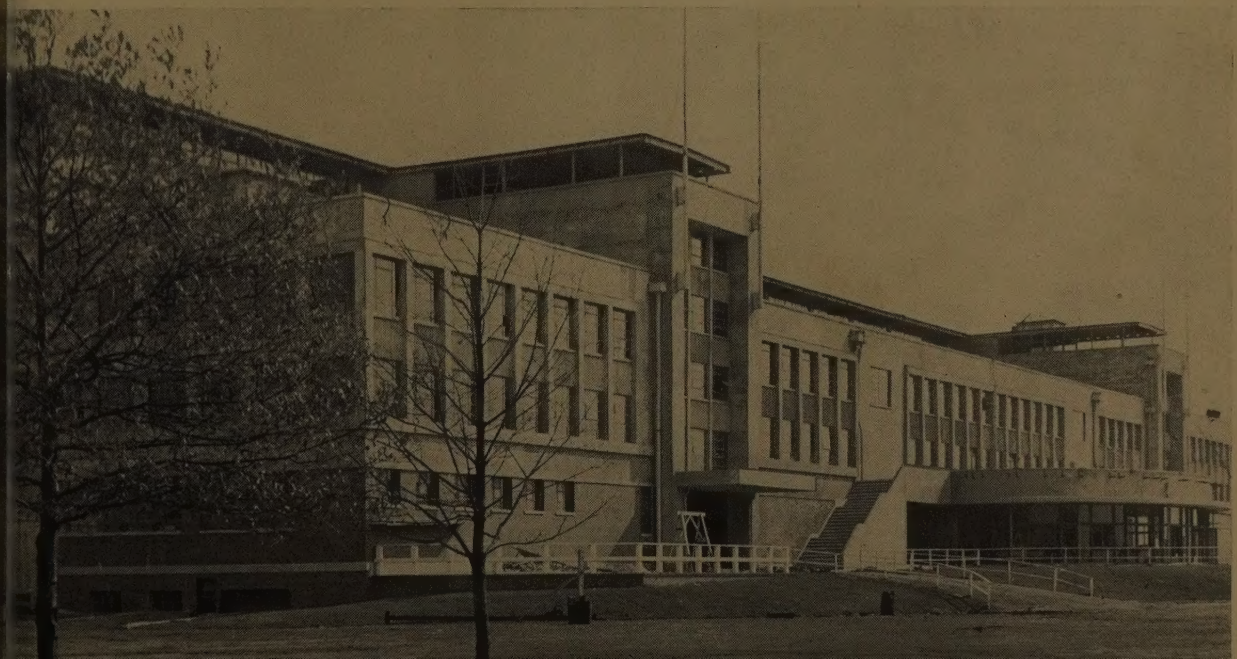
Monmouth Park Jockey Club, *Oceanport, N. J.*

By Charles Du Bose, Architect*

At the turn of the century Monmouth Race Track near Oceanport, N.J., was one of the famous racing courses of the time. Here "Diamond Jim" Brady and Lillian Russell set the pattern for racing society, and here thousands congregated in the great iron stands to follow the running of America's classics. But this festive picture faded long ago and for many years has existed only in nostalgic memory.

Now, upon the same site a new racing plant has been built. Opened to the public in 1946, Monmouth Park Jockey Club, in keeping with the traditions of the old track, is designed to afford the finest racing accommodations in the country. Situated in the horse-breeding section of northern New Jersey, its natural environment provides an ideal setting for such a development and every effort has been made to take full advantage of this asset. Throughout the grounds an extensive program of landscaping is planned to create a parklike atmosphere appropriate to the rural nature

Full-length windows and the elevated position of the dining room give an excellent view of the paddock. Exterior stairways provide direct access to the second floor from a wide terrace extending the full length of the grandstand.



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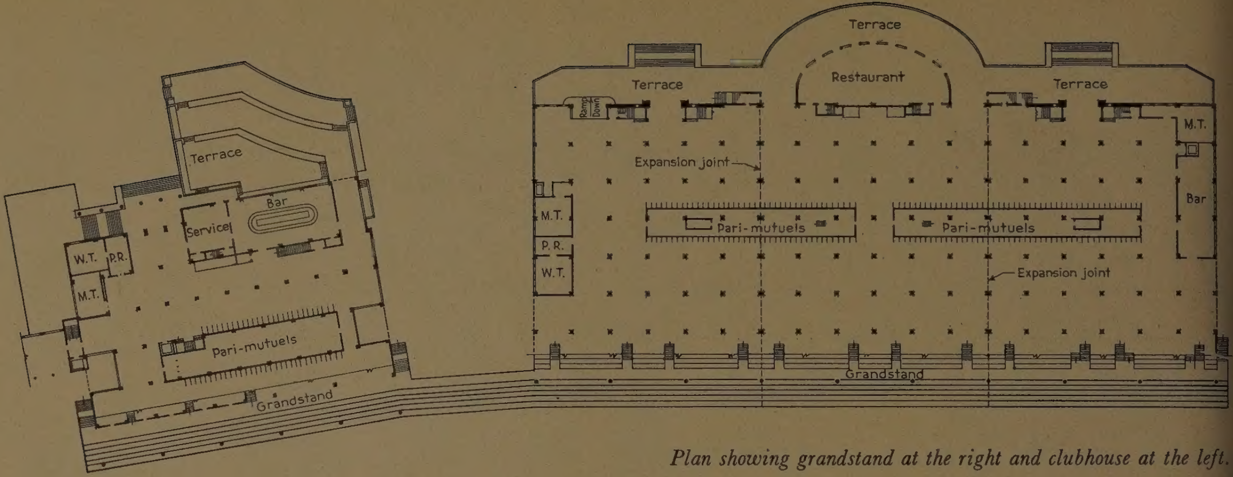
*New York, N.Y.



Plan showing grandstand at the right and clubhouse at the left.

of the countryside.

The main entrance, grandstand, clubhouse, administration building, paddock, saddling stalls and jockey buildings are grouped near the highway on the west side of the one-mile running track. Ample provision has been made for automobile, bus and taxi traffic and extensive parking areas are conveniently located. Railroad spurs enter the property on the north and deliver the racing fans directly to the grandstand. Across the landscaped infield to the east of the track is the stable area. Here are stables for 1,000 horses, living quarters for grooms and stable boys, mess hall and recreation building for employes, blacksmith shop and grounds-maintenance buildings.

Facilities for the convenience and comfort of the public are provided on an elaborate scale. Seating within the grandstand and clubhouse will comfortably accommodate more than 10,000 persons, with chairs and benches on the numerous terraces for several thousand more. The layout anticipates attendance of 40,000 without overcrowding.

Grandstand and clubhouse are firesafe structures throughout, the construction being of reinforced concrete which has been left exposed. Only the grandstand roof is of structural steel. Two main floor levels are provided in each of these buildings. Each level has a pari-mutuel department with spacious betting areas and each has its lounges, toilet rooms, powder room, bar, refreshment booths and outdoor terrace. Both buildings are equipped with passenger and freight elevators and provision has been made for the installation of escalators in the near future.

Overlooking the paddock is the main restaurant of the grandstand. This is built as a semicircular bay projecting from the building and is 40 ft. wide and 100 ft. long. Placed at a higher level than the paddock, it affords an unobstructed view of the parade ring. Around the restaurant and extending the entire length of the building is a paved terrace 25 ft. wide which serves as a promenade between the various

Tall columns and the ribbed floor slabs formed with metal domes are features of the reinforced concrete frame.

The upper two levels of the clubhouse, protected by a projecting canopy, contain the private boxes. From this elevated position one has a commanding view over the entire track.

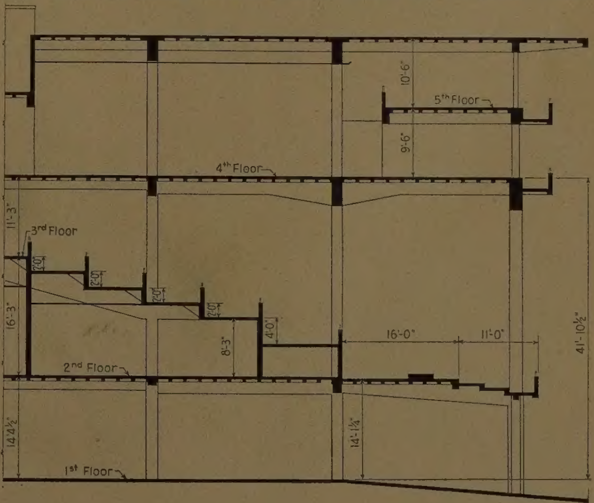
entrances and affords additional spectator space from which to view the parading horses.

The grandstand is 175 ft. deep by 450 ft. long with exterior walls and frame of reinforced concrete. Columns are spaced 25 ft. on centers in both directions. The concrete floor slabs were constructed on standard steel domes supported during construction on planks with regular wooden jacks for shoring. In the stepped seating area, each riser is designed as a beam 25 ft. long and floor slabs are 3½ in. thick. All interior partitions are concrete masonry.

The clubhouse is a five-story structure having wide terraces on several levels facing both the track and the paddock. The main dining room of the clubhouse overlooks the track and is arranged on six levels to afford full visibility from every table. An unusual feature of the clubhouse is the arrangement of private boxes on the upper two floors. These two tiers of boxes afford an exceptionally good view of the track, and each box is in reality a private club room, complete with dining table. An elaborate lounge with its own pari-mutuel department, powder and toilet rooms, bar and kitchen serve these boxes. This building is 150x200 ft. in plan, similar in construction to the grandstand except that a few walls are stucco on wire mesh.

All concrete for the project was specified for 28-day strength of 3,000 psi. except columns in the clubhouse which were designed for 5,000 psi. Air-entraining portland cement was specified to provide concrete having better resistance to freezing and thawing and the better workability which was highly desirable because of the difficult placing conditions. To accomplish these results, the concrete should contain from 3 to 6 per cent air. Periodical tests made during the progress of the work showed the entrained air to be fairly consistent at 3½ per cent. The mix for the 3,000 psi. concrete having a 3-in. slump and using 6 gal. of water per sack of cement required the following quantities per cubic yard: 6 sacks of cement, 1,165 lb. of sand, 1,857 lb. of gravel graded No. 4 to 1 in. This is somewhat less aggregate than normally is used because of the 3½ per cent air content. The 28-day strengths averaged between 3,700 and 4,000 psi. For the 5,000 psi. concrete in the clubhouse columns, the proportions were 8 sacks

Section through clubhouse showing private boxes at fourth and fifth floor levels and dining terraces between second and third floor levels.



cement, 1,118 lb. of sand, 1,640 lb. of gravel and 319 lb. of water or 4¾ gal. per sack of cement.

Vibrators were used in placing the concrete, which had a slump of 4 in. or less. The use of air-entraining cement in well-proportioned mixtures placed by vibration produced very gratifying results. The concrete was easily handled and placed without segregation or water gain and with few defects in the exposed surfaces. Control joints were placed at suitable locations throughout the structures to predetermine the location of cracks resulting from shrinkage of the concrete upon drying. Tieholes were carefully filled with mortar in which some white portland cement was combined with gray cement to match the color of the surrounding surfaces. Surfaces were cleaned by brushing on cement grout and subsequently rubbing this off with burlap. The finished concrete presents smooth, uniformly colored surfaces most suitable to the character of these structures.

The engineers and constructors of this project were F. H. McGraw & Co. of Hartford, Conn.

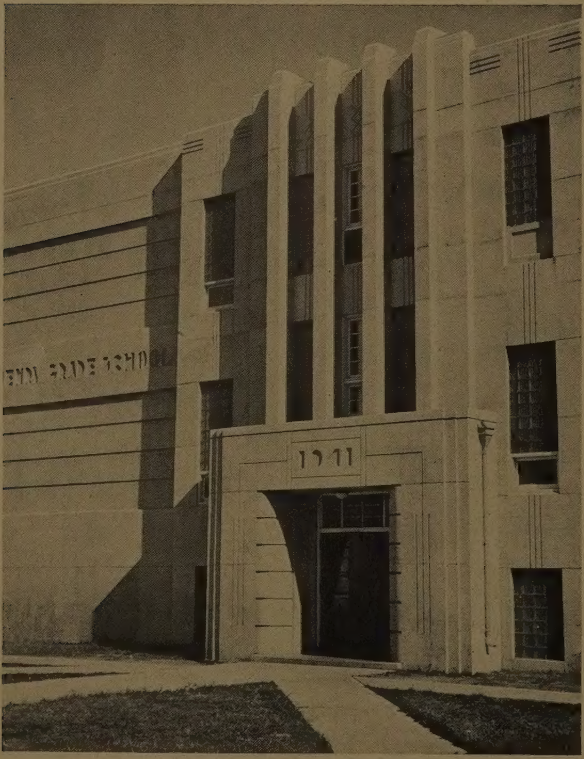
The entrance side of the clubhouse has large windows and several setback roof levels, affording excellent views of the paddock and the surrounding country.

Time Proves School Board's Good Judgment

By S. M. Houkom, Architect*

McHENRY, N.D., is the education center of the surrounding countryside. Although the village population is only 250, the community school has a capacity of 300 pupils ranging from elementary through high school age. In case of a general emergency, such as fire or tornado the school could shelter the entire town, so the school board considered it vital that the construction provide a safe place of refuge. This requirement along with the economy of concrete construction and its ability to withstand the rough treatment accorded school buildings—to say nothing of the ruggedness of the climate—led to the decision to build of architectural concrete.

The school, completed in 1941, has now been in use for more than six years, and the decision of the board to use architectural concrete has never been regretted because the



A deeply recessed doorway, a series of reveals and four piers carried up to and over the parapet center attention on the main entrance to the classroom part of the school.

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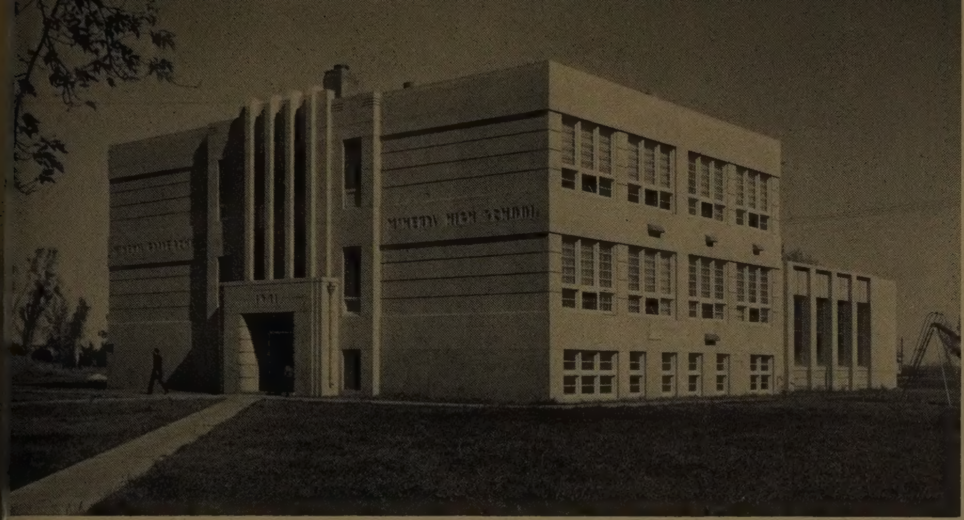
*Fargo, N.D.



After six years' exposure to the rigorous North Dakota climate the architectural concrete school in McHenry looks today as it did when first occupied. S.M. Houkom of Fargo was the architect.

uilding, as accompanying pictures show, looks today just s it did when first occupied. There is not the slightest vidence of deterioration or even any visible weathering.

As the school population is greater than that of the village self, a few problems were posed particularly in connection vith the water supply and the sewerage system. It was quite vident that both must be independent of the village sysems. Accordingly a deep well was driven for water and a arge concrete septic tank with subsurface absorption system vas installed at the most remote corner of the school roperty.

The classroom part of the building consists of two stories nd a full basement while the gymnasium section is but one tory high and the area is unexcavated. There are separate ntrances to the classroom and gymnasium sections so the atter when not serving its regular purpose may be used or civic meetings or other activities without disturbing lassroom work.

The design of the building was kept simple and well rdered but not severe. This made for economy in construcion but at the same time, an attractive building was obained which would create the desired impression on the ninds of the children.

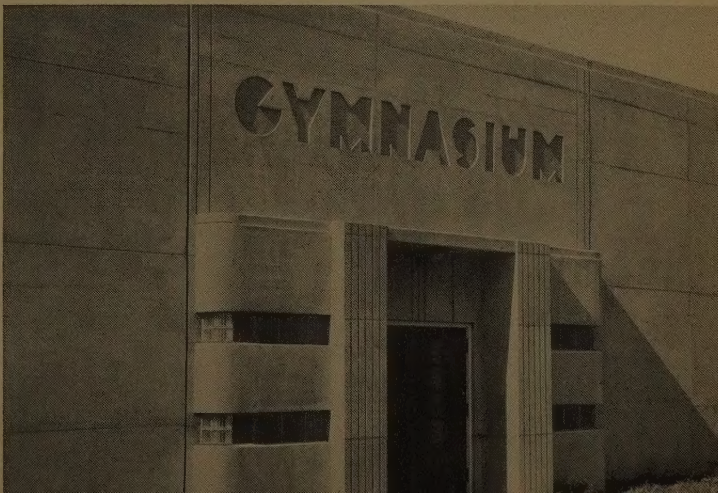
Construction was carried on during the winter which in North Dakota means many days of below-zero temperaures and continuously below-freezing weather. The crushed ranite aggregate and water used in the concrete were eated, but care was exercised to be sure the concrete was ot too hot when it went into the forms. We tried to get a emperature of about 80 deg. It was necessary of course to rotect the concrete from freezing. This was done by packing hay, straw or similar material between the studs of the forms and salamanders were used in the interior of the building to supply heat whenever needed.

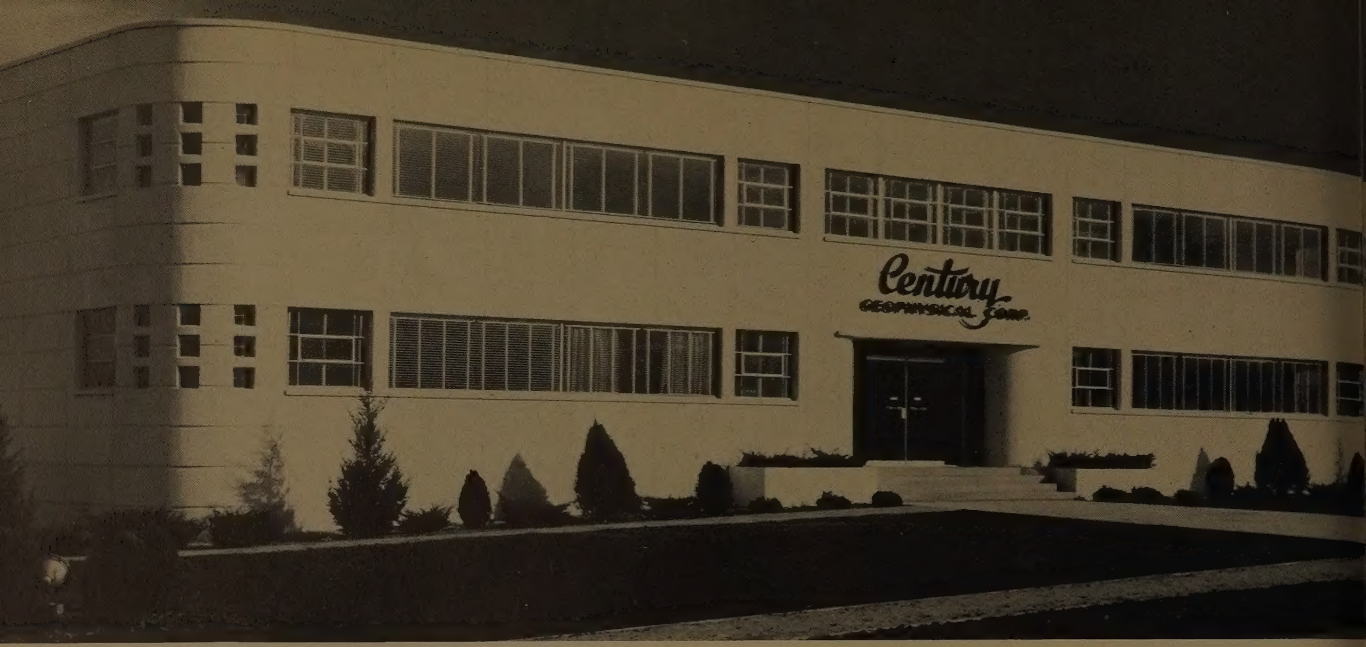
Plywood forms were used throughout, but owing to the shortage of the material it was pretty well cut up by the time the gymnasium, which is at the rear of the building, was built. This resulted in more joints and a somewhat less smooth surface than in the classroom part of the building. These slight irregularities, however, did not seem to be objectionable. In fact they gave a certain character to the walls which was altogether pleasing. All walls were cleaned and left unpainted. To my way of thinking this gives an appearance which improves with age and exposure to weather.

The name of the school and the lettering over the entrances were incised by tacking wood molds in the shape of the letters to the form sheathing. The incised surface of the letters was bush hammered to get more contrast between the lettering and the wall surface. Because of this the lettering is easily read even in flat lighting.

McHenry citizens and the surrounding community continue to be well pleased with and proud of the solution of their school problem. And well they may be, for they have received maximum service at least possible first cost and no maintenance expense in their building.

The incised lettering over the gymnasium entrance was made to conrast with the adjacent wall surface by bush hammering the incised urface of the letters.





The architectural concrete walls of the Century Geophysical Corp. building at Tulsa, Okla., have rustications at 2-ft. intervals vertically and at 6-ft. intervals horizontally to make best use of plywood panels retrieved from aircraft shipping boxes for forms. F. V. Kershner, architect, and Waller-Wells Construction Co., contractor, both of Tulsa, Okla.

Use of Aircraft Shipping Boxes for Forms

—influences architectural design —makes more building possible

The building was carefully designed on the 2x6 ft. module so that rustications would coincide with tops of window openings. Corners of building were rounded to harmonize with the curved entrance reveals.

By Frederick Vance Kershner, Architect*

In these days of high prices many an owner has had to trim his ideas of minimum requirements when bids were received to keep the job within funds available. Such experiences are no longer news, but when an additional story can be built and other facilities not originally planned can be provided because costs did not come up to estimates, that *is* news.

Preliminary plans for the Century Geophysical Corp. building at Tulsa, Okla., indicated that only a two-story building which would be one-story in height on the street side and two stories in the rear could be constructed with he funds available if masonry were used. Studies indicated hat architectural concrete would be more economical if a uitable form material could be located at a reasonable ost. This was during the period following the war when hortages in all lumber were extremely acute and when plywood or kiln-dried lumber suitable for form sheathing was almost unobtainable.

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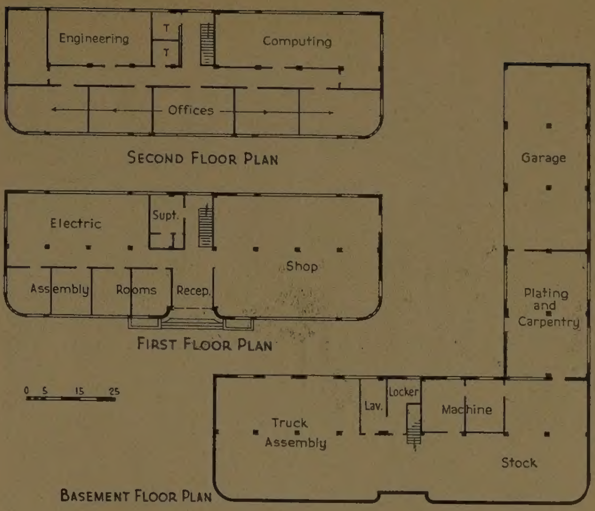
*Tulsa, Okla.

A diligent hunt by the contractor uncovered some plywood shipping boxes which could be purchased from a local aircraft factory. These boxes were made of ⅝-in. plywood, he sides being 2x6 ft. with only one face usable. Though he plywood had not been made with waterproof glue, the contractor decided he could get two uses from the panels f the edges were properly protected against moisture and njury. After consultation it was agreed to develop a design on the basis of the 2x6-ft. module with horizontal and vertical rustications dividing the panels. This was agreeable to he owner and it was decided to go ahead with construction.

The shipping boxes were taken into the contractor's shop and dismantled. The paint was sanded off the plywood which was then treated with form oil on sides and edges to protect it from moisture. The original contract called for the two-story building's having one story above street level and one below. When the forms were removed from the upper story they were still in good condition and the construction costs were below the estimates. Under these favorable conditions, the owner contracted for another floor which the architect had planned to add in the future. When the forms were stripped from these walls, they were still serviceable and it was decided to use them for construction of a one-story garage and shops addition 24x96 ft. extending back from the main building.

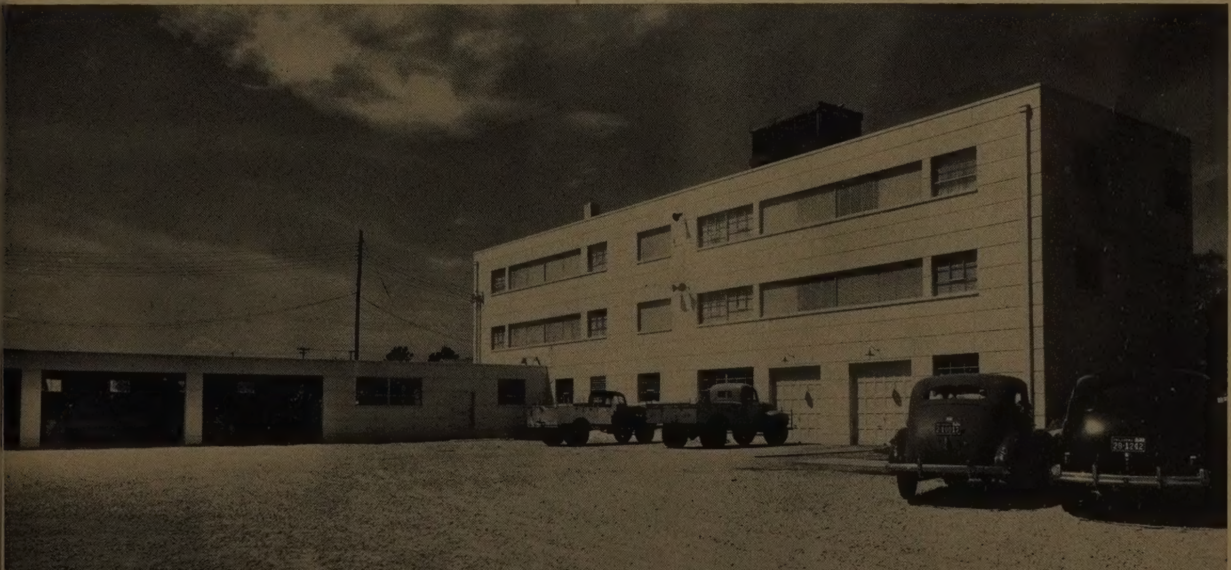
The building is 36x108 ft. in plan with floors and roof of pan-joist construction with one row of columns. Walls are 8 in. thick. Construction joints in the walls were made to



coincide with the rustication strips but no control joints were provided in the belief that any cracks that might develop would occur in the rustication strips and would not be noticeable. Except for shallow sills under the windows and a narrow projecting band as a coping, the walls have no decorative features other than the rustications.

The deeply recessed entrance at the center of the street facade is made to appear wider by the curving sidewalls and is further emphasized by the wide plant boxes at either side of the steps and by the dark lettering contrasting with the light colored wall. Windows have been grouped in long horizontal bands. Square openings at the curved corners are filled with glass block. Thus an attractive, businesslike, efficient building has been achieved but austerity in design has been avoided by the sweeping curves in the lettering, the entrance walls and at the corners. Built in 1946 by Waller-Wells Construction Co. of Tulsa, the cost was considerably less than it would have been with masonry walls.

The fenestration on the rear of the building is similar to that on the front and gives an abundance of light to the interior. The concrete walls in the one-story extension were given the same treatment as those of the main structure.



Modern Concrete

by ALBE

Main entrance of the Brunswig Drug Co. warehouse and office building in Vernon, Calif. Albert C. Martin and Associates, architects and engineers; Wm. Simpson Construction Co., general contractors, all of Los Angeles.

THE Brunswig Drug Company's warehouse and general office building in Los Angeles has now been in operation more than a year and despite rising costs in the distribution field, the building has succeeded in effecting the economies striven for in its design.

Situated on Santa Fe Ave. in the Vernon District of Los Angeles, the new structure is the main distribution channel for more than 1,200 drugstores which the company services in Southern California. It is of reinforced concrete construction, 362x312 ft. in plan, and provides in its two stories more than 225,000 sq.ft. of storage and material-handling space and office space.

Before considering it architecturally and structually, the building's function may be outlined briefly. The Brunswig operation is much like that of any distributor, with the difference that the items involved are smaller in bulk and greater in number. Brunswig handles between 30,000 and 35,000 different commodities. These goods arrive at the warehouse in "full" packages and are supplied to the retail outlets in broken-package quantities as requested.

Today most warehouses are being designed as one-story structures to utilize fully the efficiency of motorized conveying equipment. For the Brunswig building it was decided that full use could be made of such equipment with even greater economy in a two-story structure which would bring all operations into close proximity. The first floor is given over to receiving and shipping departments and to full-package storage. Directly above on the second floor is the broken-package storage. Six vertical conveyors handle traffic between floors. As full packs are brought to the second floor on the conveyors they are transferred to the proper zone where they are broken and placed on steel shelving, which is a part of the "order pick line." Assembled orders finally reach the checking section and packing department. From there they go to the shipping department on the first floor. Mechanical conveyors do 90 percent of this work.

On the ground floor approximately 107,000 sq.ft. is devoted to shipping and storage and the remaining 5,000 sq.ft. is used for entrance lobbies, toilet facilities, machine and boiler rooms. On the second floor in addition to the storage space, order filling department, checking and packing departments, are the general offices. In the general office section there is a 100-seat assembly room with motion picture facilities and lecture stage. A large display room with specially designed cabinets and showcases is also a part of the general office.

In the structural design of the building we were confronted with the problem of developing a design having the adaptability necessary to meet operational requirements but with maximum economy. This was accomplished by using what we call "flat beam recessed panel" reinforced concrete construction, which we have been using for more than 30 years. It combines the adaptability of beam and slab construction with the economy of flat slab floors. In our use of this we have found it to cost but a few cents more per square foot than a conventional flat slab job. This added cost is more than offset by economies in the operation of the plant resulting from the adaptability of the construction to job requirements.

As shown in a partial plan of the second floor and the accompanying section, the flat beams which run continuously in two directions over the columns spaced 24 ft. on centers are 8 ft. wide and 12 in. deep. The slab between

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*Albert C. Martin and Associates, architects and engineers, Los Angeles, Calif.

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g distributor in Los Angeles

AIA*

beams is but 6 in. thick. The beams are designed as continuous in both directions and the slabs are considered as two-way slabs fixed at the edges. If need be, these panels can be omitted altogether to provide for conveyors, stairs or escalators, or intermediate beams can be used to frame smaller openings without affecting the structural characteristics of the adjacent floor. The design analysis is simple and the resulting floor shows even less deflection than conventional flat slab construction.

The function of the building demanded wider bays on the second floor, so every other column in one direction was omitted, thus forming bays 24x48 ft. The roof was carried on laminated wood arches supported by the concrete columns and continuous reinforced concrete beams. The beams and columns are designed to take bending in a lateral direction because of the thrust of the arches which are without horizontal tierods. This was done to allow for the possibility of a fire which might destroy one or several bays of the roof. Around the perimeter of the second floor a series of rigid frame bents of approximately 18 to 20 ft. span act as abutments for the arches in the outside bays.

The architectural concrete exterior walls have a smooth surface finish with a brush paint coat. Control joints in the walls were located in the center of each bay and have been most successful in limiting shrinkage cracks to predetermined locations. These control joints are continued through the concrete eaves which overhang the exterior wall approximately 4½ ft. At these joints in the eaves the longitudinal steel was stopped off, thereby making each panel an independent unit.

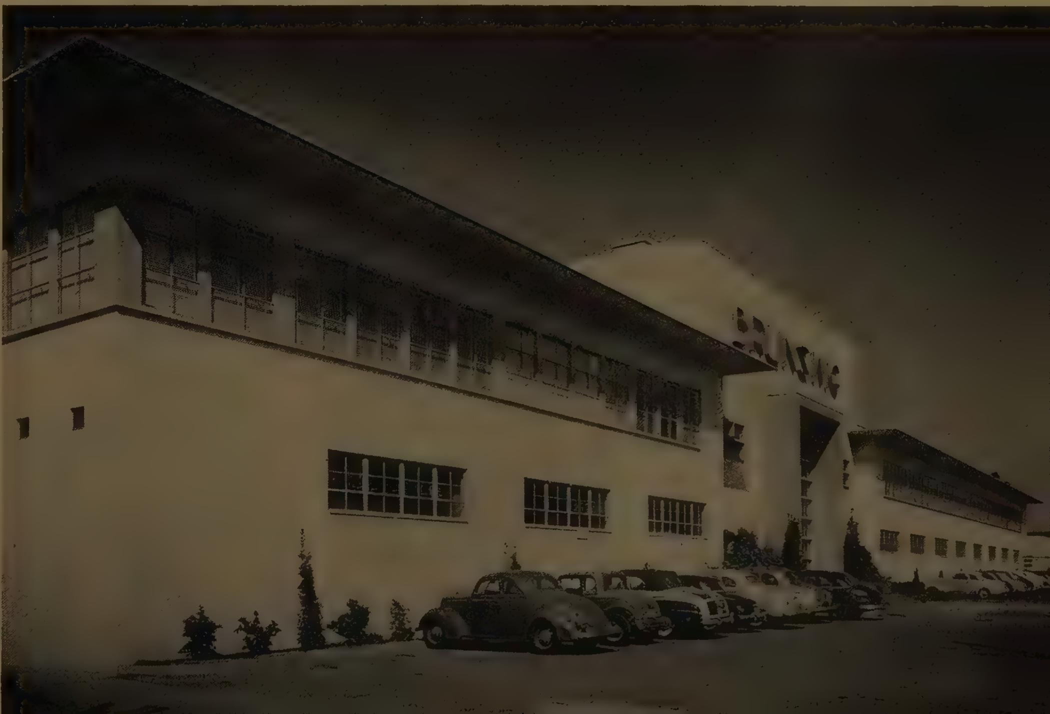
The building is simple and modern in architectural treatment. The focal point of interest is logically the main entrance which is located offcenter. Here the building wall is set back about 4 ft. for a distance of 72 ft. and the entrance itself is enclosed in a two-story projecting frame faced with ceramic veneer for an effective contrast of color along with the adjacent brick-walled planting areas. The lobby is lighted by clear glass panels which occupy the entire area within the projecting frame of the entrance. To focus further attention on this facade the wall surface is patterned with vertical and horizontal V-joints which contrast with the smooth surface of the remainder of the structure.

The building was set back from the street to allow room for a customers' parking lot at the front. Employe parking is at the rear adjacent to the service yard.

Interior appointments are modern. All offices are air-conditioned and finished with sound-absorbing ceilings. Wall surfaces are furred and plastered. Fluorescent lighting is used throughout the building and a complete sprinkler system safeguards against fire. Construction was by the Wm. Simpson Construction Co., general contractors, Los Angeles.

When one recalls some barnlike warehouses common in the past, the Brunswig building typifies strikingly the change in thinking which owners have undergone during the last decade. The building—clean, neat and pleasing to the eye—might be termed three-dimensional public relations yet its basic reason for existence, which is the efficient distribution of merchandise, was and is paramount.

Santa Fe Ave. elevation of the Brunswig warehouse-office building with customer parking lot in foreground. Control joints in the smooth-finished exterior walls are barely discernible through the center of the ground floor windows. Joints continue through the concrete eaves which overhang exterior wall 4½ ft. and are designed to act as independent units.



The front wall of the Rose Marie Reid, Ltd. building was cast in place. All other walls were precast on the floors and tilted into position.

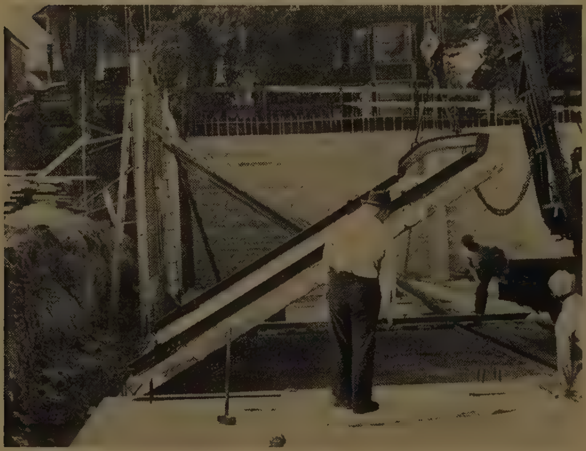
Tilt-up Construction

used on two-story building in Vancouver

By Eugene S. Paone*

When Rose Marie Reid, Ltd., of Vancouver, B.C., decided it needed a new building there were acute shortages of many building materials, particularly lumber and nails. Studies showed that the amount of these materials required could be kept to a minimum by use of the tilt-up method of constructing concrete walls. After thorough investigation this system was adopted, not only for the ground floor walls but also for those of the second floor, making this one of the first examples of tilt-up construction on multistory buildings.

In tilt-up construction the floor is erected first. Reinforced concrete wall panels of a convenient size are then cast horizontally on the floor. After these are hardened sufficiently they are tilted up to the vertical position. Spaces are left between adjacent panels which are filled in with concrete cast in place to form columns or pilasters. Reinforcing steel projecting from the sides of the panels ties the panels to the columns. The top surface of the panel becomes



First-story wall panels were cast on the floor adjacent to their final position, except the corner panels, and were tilted up into place by a crane operating from the inside of the building on the casting floor. The lower part of the front wall is a cast-in-place retaining wall which can be seen in the background.

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*Construction superintendent, Alfred Horie Construction Co., Ltd., Vancouver, B.C.

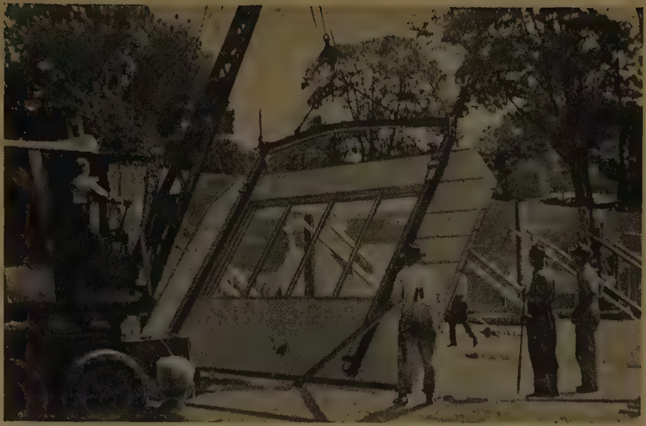
the outside wall surface and is easily given a float, trowel or other finish.

Reid's is a two-story, all-concrete building 66x125 ft. in plan. With the exception of the front wall, which consists of a 12-in. buttressed retaining wall for the first story and a conventional cast-in-place wall above, all walls of the building were erected by the tilt-up method.

The footings and foundation walls were first constructed in the usual manner. The ground floor slab was then placed, the surface floated and troweled to its final finish. Heavy, waterproof, wax-coated paper was spread on the floor to protect it and to prevent the concrete in the panels from sticking. Bulkheads of 2x6's were then erected for the sides of the panel forms. All panels were 6 in. thick. Reinforcing which consisted of ½-in. round bars on 13-in. centers each way, was placed in holes drilled in the bulkheads. This amount of reinforcing was the minimum permitted by the Vancouver building code. Horizontal bars projected 7 in. each side for bonding to the columns. Bolt templets and bolts for attaching the lifting rig were fastened into position and the concrete was then placed, struck off, floated and troweled just as in placing a floor slab. Care was taken to prevent pushing out or creasing the paper underneath. All bolts were recovered and used in constructing the wood roof trusses.

Panels for the ground floor, which were made during the summer months, were cured for 7 days; those for the second floor were cured 14 days because of the cooler autumn weather. After curing, the panels were ready for tilting or lifting into position. For this purpose two 5-in. H-beams, slightly shorter than the height of the panel, were fastened to the panel by bolts cast in the concrete. Four bolts were used near the upper end and two near the lower end of each beam. The beam was wedged tightly against the concrete. A 5-in. H-beam was used as yoke and hinged connections were made at each end where the yoke was fastened to the H-beams on the panel. Plates ½ in. thick were used for this purpose. The hinged joints permitted the yoke to rotate as the panels were lifted to the vertical position. The yoke beam could well have been of somewhat larger section because it bent considerably when lifting some of the larger panels as the pictures show.

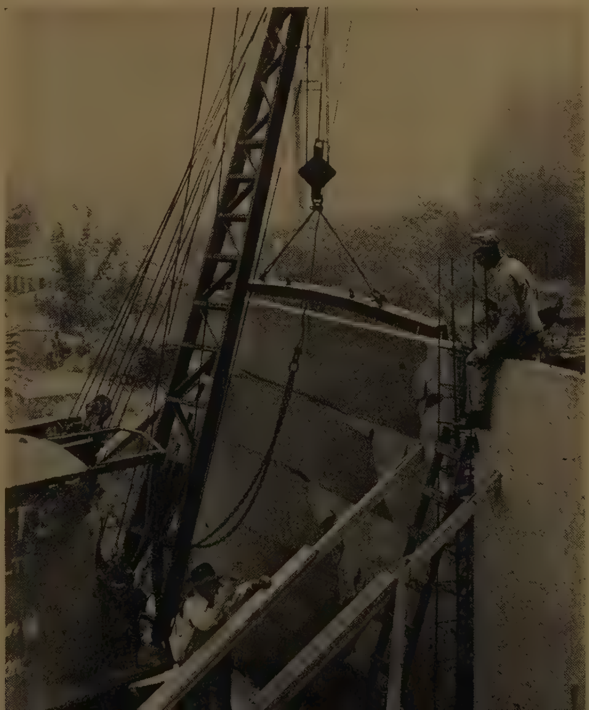
A truck crane of 8-ton capacity was used to erect the ground floor panels. This could be maneuvered into position on the casting floor so that erection was from the inside.



Corner panels were cast on the floor in the center of the building. They were tilted into a vertical position and then carried by the crane to their proper location in the wall.

Because of overlapping at the corners, some corner panels weighing about six tons each were cast in the middle of the floor and had to be lifted clear of the floor and moved to the proper position in the wall. All this was done with the truck crane. As each panel was tilted up into position it was braced. Bolts for anchoring the lower ends of the braces had been cast in the floor slab between the panels. The upper ends of the braces were secured to pipe hangers which consisted of 2-ft. lengths of No.3 pipe hangers bent so that one end could be tucked under the paper, the other fastened to a reinforcing bar. Column forms and reinforcement then were erected and the concrete was cast in the columns to tie the panels together.

After the second-story floor slab had been constructed the casting and placing of slabs was repeated for the second-story walls. The greater story height here resulted in larger, heavier slabs, weighing approximately 12 tons each. In this



While panels are held by the crane they are firmly braced in position. At the top braces are fastened to pipe hangers cast in the concrete and strap anchors fastened to floor by embedded bolts secure them against sliding. Note reinforcing steel in place for column which subsequently will fill space between and anchor adjoining panels.

The second-story panels were tilted into position in the walls by a crane operating from outside the building. The workmen at the left of the picture are operating winches to snub the bottom of the panel to be sure it does not slip outward. A block and tackle kept the top of the panel from going too far past the vertical. In the foreground are two corner panels cast on the floor in the center of the building. In the background forms are erected for the cast-in-place front wall.

case the panels were erected from the outside by a 12-ton truck crane operating on the adjoining property. It was found necessary to supplement the lifting capacity of the crane by attaching a line from a winch truck to the boom of the crane to raise the boom when lifting the heaviest panels. Two winches placed on the floor were used to snub the bottoms of these panels and a set of block and tackle was used to prevent the tops of the panels from going too far past the vertical and to make the final adjustments in plumbing. Corner panels, which were cast in the center bay of the floor, were skidded forward and then lifted into position.

On the ground floor 14 panels 16 ft. 4 in. wide by 13 ft. 11 in. high were required for the side walls and 2 panels 20 ft. 2 in. wide by 11 ft. 11 in. high were required for the rear wall. One rear panel containing a large door 11 ft. wide and a door of standard width was cast in place. The 16 tilt-up panels were erected in 17 hours with good weather conditions.

For the second floor, the 14 panels for the side walls varied in height from 18 ft. 10¾ in. to 22 ft. 1¾ in. Three panels 20 ft. 2 in. wide and 16 ft. 8 in. high were used in the rear wall. These panels required 40 hours for erection because of adverse weather conditions of rain and near-freezing temperature.

Cost data compiled on this job and for similar work where the concrete was cast in place indicate that there is a saving in favor of the tilt-up method equivalent to the cost of labor and material for one face of the forms. This represents a saving of about one-third of the wall cost. Alfred Horie Construction Co., Ltd., Vancouver, B.C., Canada, was general contractor. Ready-mixed concrete was furnished by Diethe, Ltd., Vancouver.

Building Project at Andrews Field

NAMED in honor of Lt.-Gen. Frank M. Andrews who was killed in an air crash in Iceland, May 3, 1943, Andrews Field Army Air Base is situated on a 4,274-acre tract at Camp Springs, Md. Designed as a fighting field where fast pursuit planes could be based for protection of the nation's capital, it will continue to be an active Air

The design provides an abundance of air and light to all parts of this administration building at Andrews Field Air Base. Ballinger Co., Philadelphia, Pa., engineers and architects. Harwood-Nebel Construction Co., Inc., Washington, D.C., contractors.

From the main entrance side the building appears as a low two-story structure. Actually it is three stories, the main entrance being at the second floor because of variation in ground level.

Force base with promise of an even busier future. In addition to a commodious administration building, it will have a modern hospital, hangars, shops and officers' quarters and will be equipped with the latest radar developments.

The administration building consists of a central rotunda from which radiate five wings like spokes of a wheel, or to be more exact, a half-wheel, since they occupy a halfcircle. Architectural concrete walls are combined with floors and frame of reinforced concrete and partitions of lightweight concrete masonry to insure maximum firesafety. The three-story building provides 150,000 sq.ft. of floor space, enough for a force of 1,500 people.

Each of the five main wings of the administration building is 50 ft. wide and of various lengths with ells projecting from the two wings which comprise the front of the building. The halfcircular hub has a diameter of 173 ft. 3 in. which together with the wings extending across the front makes the long dimension of the building nearly 550 ft.

The main entrance leads to the second-floor level of the rotunda, the first floor being somewhat below the ground level of the entrance side. Other entrances have been provided at or near the outer end of each wing. One projecting ell contains the post exchange, kitchen and auditorium. The rest of the building either is divided into offices or will be as the need arises.

The outer cast-in-place concrete walls are 12 in. thick. They are furred and plastered on the interior. Grooves were formed in the exterior wall surfaces both horizontally and vertically by nailing ¾-in. halfround strips to the forms. Expansion joints were placed at the junction of each wing and the rotunda, and are so designed that they are not visible on the exterior. Control joints were used at the center line of the windows and extend all the way from foundation wall to the roof. An overhanging coping was precast and then set in place to reduce the expense of forming on the job.

Floors are of cast-in-place joist construction with lightweight concrete masonry fillers. Similar units are used for partitions. Round columns in post exchange cafeteria are shown here.

The heating plant is housed in a separate building. The smooth architectural concrete walls are divided into a pattern of rectangles by grooves produced by attaching ¾-in. halfround strips to the forms.

Two hangars at Andrews Field of ZD barrel shell reinforced concrete construction. Designed by Roberts and Schaefer Co., engineers, Chicago, Ill.

Each wing has a corridor 8 ft. 4 in. wide down the center with rooms on either side. Columns are in line with the corridor partitions. The corridor floors are 4-in. slabs on 16x24-in. beams. The floors outside the corridor are 12+3 in. cast-in-place joist construction with 12x8x16-in. concrete masonry filler units. The roof is also of cast-in-place concrete joist construction with concrete masonry filler units.

The heating plant is in a separate building 53x96 ft. in plan and 40 ft. high. Construction throughout is similar to that of the administration building.

Architects and engineers for these buildings were the Ballinger Co. of Philadelphia. Harwood-Nebel Construction Co., Inc., Washington, D.C., was contractor.

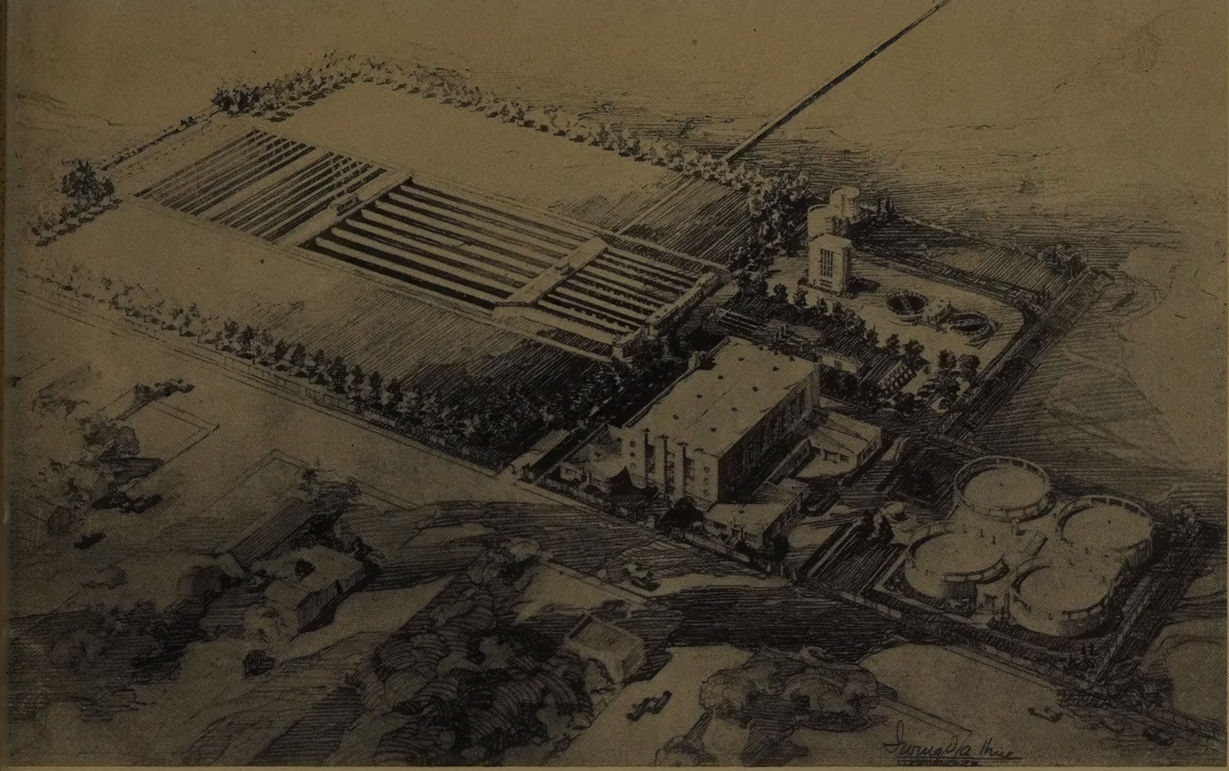
There are two hangars at Andrews Field with ZD barrel shell concrete roofs with spans of 160 ft. The doors are 160 ft. wide by 26 ft. high. Exterior walls are concrete masonry. These structures were designed by Roberts and Schaefer Co. of Chicago. All construction at Andrews Field was under the direction of Col. Donald White, district engineer, with E. J. Merrick, Jr., as resident engineer.

Bowery Bay Sewage Treatment Plant

SERVING a drainage area of 6,000 acres, for which the 1940 census showed a population of 270,000 people, the Bowery Bay Sewage Treatment Plant is one of 18 plants in the plan for sewage disposal for the City of New York. The present plant capacity of 40 mgd. is about ⅓ of the ultimate, but some of the structures such as the power, office and laboratory building, plant outfall and dock are adequate for the final 120 mgd. plant while all other structures are designed to handle the present load of 40 mgd. of sewage. Eventually the plant will serve an area of 14,810 acres with an anticipated population of 725,000. All structures are reinforced concrete with the exception of the exterior walls above the basement in the main pump, power, office and laboratory building which are brick.

Construction work on this plant was started in 1938. Because of its proximity to LaGuardia Airport and the World's Fair site, the portion of the work necessary to provide primary treatment was rushed to permit operation in the fall of 1939. The remainder of the construction necessary to provide complete treatment was continued until the plant was placed in full operation in 1942. Total cost including intercepting sewer, land and engineering was $5,400,000.

Effluent from the plant is discharged into closely adjacent class A waters, as defined by the Interstate Sanitation Commission and therefore complete treatment was required. An activated sludge type of plant was chosen but the usual

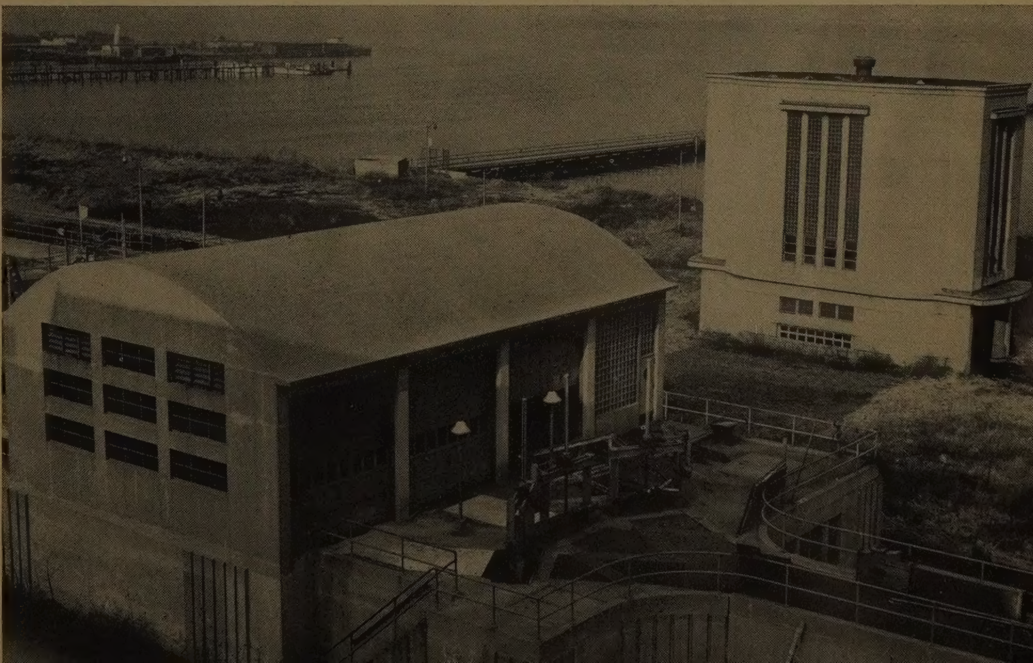


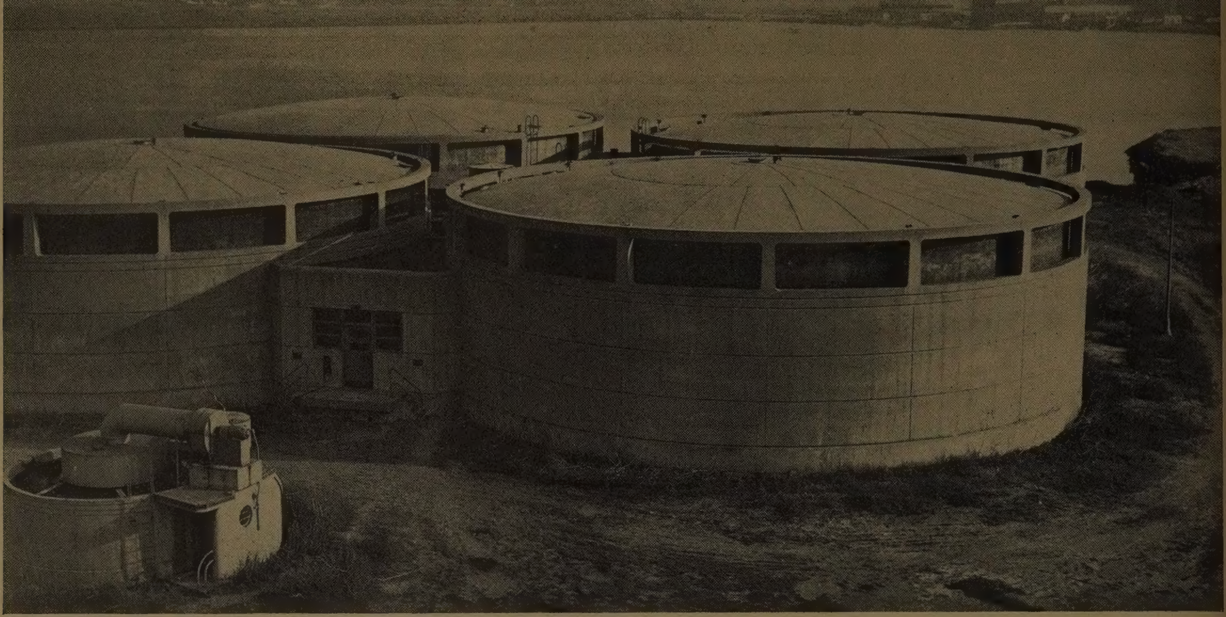
Artist's sketch showing bird's-eye view of Bowery Bay Sewage Treatment Plant in New York City. Designed by department of public works, Frederick H. Zurmuhlen, commissioner.

cycle was modified to provide about one-half the usual aeration period. The plant design includes some novel features such as final tank sludge collection at the effluent end. The effluent is discharged through an outfall of 1,400 ft. of 72-in. diameter reinforced concrete pipe supported on piles. It is dispersed into 39 ft. of water through 58 diffusers. Sludge after thickening is digested for power and heat recovery and is finally barged 38 miles out to sea or is trucked away for use as fertilizer. Gas from digestors furnishes fuel for two 300-h.p. gas engine generators and consequently provides a substantial part of the normal power for four sewage pumps and four air blowers.

The grit chamber superstructure is an architectural concrete building 36x53 ft. in plan. It has a concrete shell roof 4½ in. thick at the spring line, tapering to a thickness of 3⅛ in. at the crown. The upper parts of the end walls of the building serve as stiffening diaphragms for the roof and are 10 in. thick. Below, the walls are reduced to 8 in. Side walls are made up of glass block panels and large overhead operating doors between 12x15-in. columns.

Grit chamber building is in foreground and grit storage building in background. The concrete shell roof on the grit chamber building is 3⅛ in. thick at the crown.

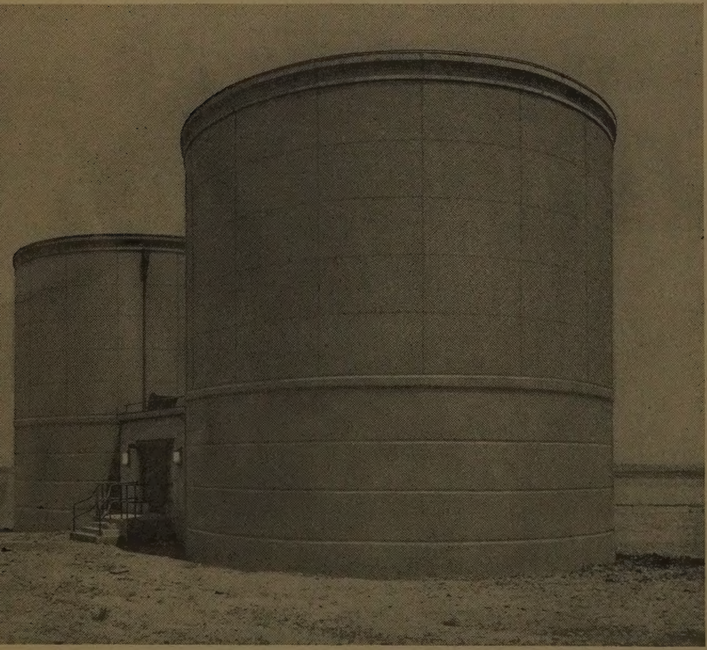




The four sludge digestion tanks are connected by an operating building. Inside the upper section of each of the concrete tanks is a steel gas-holder type of tank.

Nearby are two steel grit storage bins of 1,900-cu.ft. capacity each, housed in a reinforced concrete building. This is the tallest structure in the plant, equivalent in height to a five-story building. Continuous vertical panels of glass block extend the equivalent of three stories and ventilating sash is provided below as a continuation of each panel. Doors large enough to permit the entrance of trucks are located at either end.

Sludge storage tanks are 34 ft. in diameter and 34 ft. high from top of sloping roof to springing line of 3½-in. thick domed roof.



Thus far only four sludge digestion tanks have been built. These tanks are 81-ft. inside diameter, 40 ft. in height from top of footing to top of wall and are partly underground. The top of the footing is 13 ft. below grade. Tank bottoms slope to sumps 10 ft. below the top of the wall footing. The maximum depth of liquid at the wall is 32 ft. and at the center of the tank 42 ft. Tanks are connected by an operating building having reinforced concrete floors and roof as well as concrete walls.

Two sludge storage tanks 34-ft. inside diameter are placed 55 ft. center to center and the space between them is taken up by a one-story and basement operating building. Tank walls are 35 ft. high from the top of the sloping bottoms to the springing line of the domed roofs.

The preliminary settling tanks, final settling tanks and aeration tanks are grouped together with ample space for a duplicate installation on each side. All these structures are, of course, constructed of reinforced concrete as are also the meter register buildings located at one end of each group of tanks. They are 17 ft. by 33 ft. 10 in. in plan with rounded corners and have a cantilevered canopy projecting 18 in. around the entire building. They have glass block corner windows and side windows of ventilated sash. Interior walls are lined with salt glazed tile. Concrete roof slabs are covered by cinder fill, cork insulation and builtup roofing.

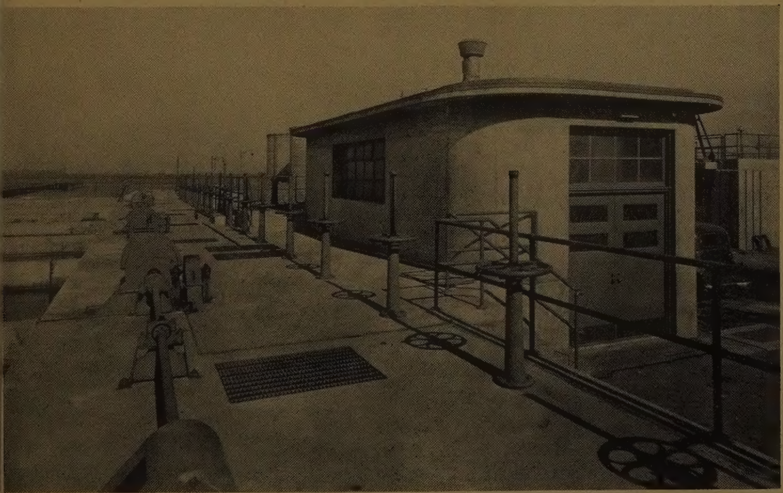
Plywood sheathing was used in all form construction for these structures, and because of their utilitarian nature and location, little attempt was made to provide decoration except for a few belt courses, rustications and V-incised

The operating building for the sludge thickener tanks is designed for utility and constructed of reinforced concrete throughout.

grooves. The concrete for all superstructures and almost all other work except certain foundations and some precast pipe and other special uses was specified to have a strength of 3,500 psi. at 28 days. Special care was exercised in both the design and construction of the buildings to insure good concrete surfaces because they were to be left exposed. No waterproofing agents were used in the concrete. Reliance was placed upon careful inspection and good workmanship to produce a watertight job and excellent results were obtained.

Planning of the project and design of the structures were done by the staff of the department of public works. Construction was by Tully and DeNapoli, Long Island City; Caye Construction Co., Brooklyn; and Lane Engineering Corp., New York City.

At each side of the group consisting of preliminary settling tanks, aeration tanks and final settling tanks, is space to duplicate present facilities to increase plant capacity from 40 to 120 mgd.



The small meter register buildings in connection with settling and aeration tanks are of simple design in keeping with the utilitarian purpose of the entire plant.

ARCHITECTURAL CONCRETE

How striking design effects may be integrated with the dynamic structural strength of Architectural Concrete is shown in this detail of a building corner and plaza approach drawn by Hugh Ferriss. Any design effect an architect may conceive for apartment houses, schools, hospitals, industrial or office buildings may be produced economically in firesafe, rugged, enduring concrete.

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